

Radiation need not be feared, but it must be respected.

Karl Morgan
The Nuclear Barons
1981

Forum

Taking the Ocean's Temp

In an experiment proposed by the Scripps Institution of Oceanography in La Jolla, California, scientists are now attempting to listen to the ocean's temperature to provide information about global warming, but some environmentalists would rather they listen to concerns about the project's effect on whales and other marine mammals.

In the study, underwater speakers would emit sound blasts across the Pacific Ocean once a day for two years. The speakers would send low-frequency noises for 20 minutes from a depth of about 3,000 feet off the coasts of California and Hawaii. Receivers would be located throughout the Pacific and operated by Australia, Canada, France, Russia, New Zealand, South Africa, and the United States. Because sound travels faster in warm water than in cold, scientists hypothesize that they could detect temperature shifts by monitoring the sound's speed through the ocean. The project

has been protested by some biologists and environmentalists who claim the sounds could deafen whales and other marine mammals, making them unable to navigate or find food.

The project would provide unique information because of its span across thousands of miles of ocean. The ocean is one of the best indicators of climate change because it slowly stores up heat caused by a buildup of greenhouse gases in the atmosphere. The project, called Acoustic Thermometry of Ocean Climate (ATOC), would run for a two-year test period and, if successful, a long-term program may be established, because global warming of the ocean would only be measurable over a long period of time. Scripps hopes the experiment will validate concerns about climate change. "It would eventually give credibility to predictions of climate change," said Walter Munk, the principal investigator for the project. "In the past,

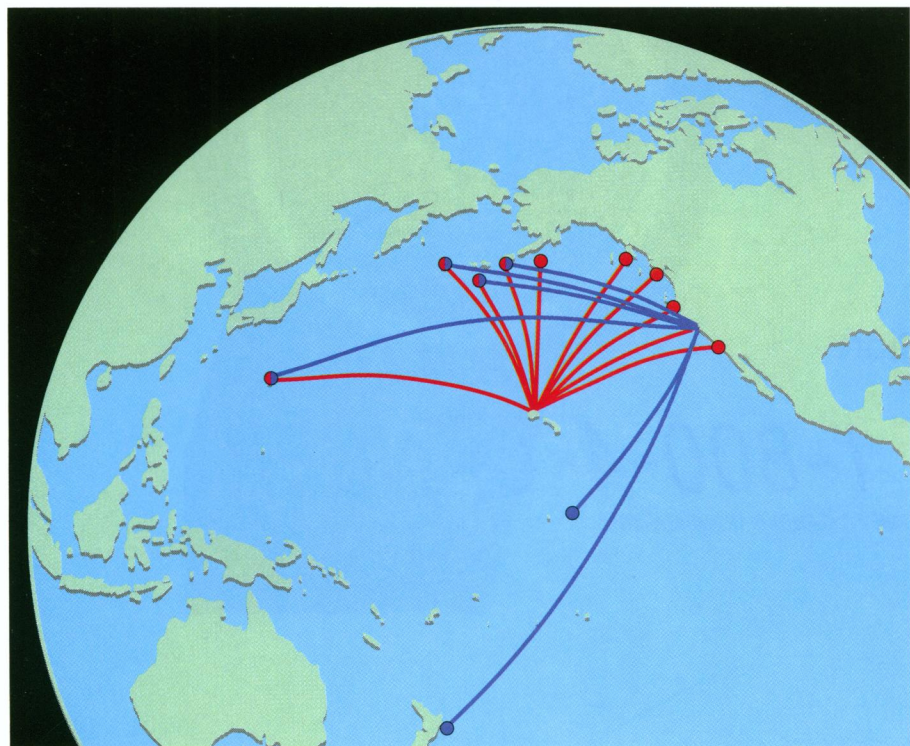
no one has been able to test them."

Although the experiment would provide valuable information to research on global warming, biologists point to research that has shown that sharp underwater sounds can harm marine mammals. Protests are also stemming from the fact that the California speaker is to be placed in the Monterey Bay National Marine Sanctuary, which is home to whales, squids, seals, and sea otters, as well as other marine animals.

The scientists at Scripps Institution say these accusations are exaggerated and claim that, at worst, the sounds proposed in the experiment are equivalent to those emitted from a large merchant or cruise ship. But the institute has responded to the protests by expanding the work of its Marine Mammal Research Program, a task within the ATOC program. According to Cindy Rogers, a member of the ATOC Project Office, the research program has been studying the potential effects on mammals from the onset of the development of the project. "We've always been concerned about what the potential impacts might be," Rogers said. The program is made up of some of the leading marine biologists in the world, who are conducting rigorous studies about the mammals, including aerial and boat surveys, sight and sound observations, and some tagging, she said. As concerns about different species develop, the species have been incorporated into the studies.

The expansion of mammal research has mitigated the protests. Scripps has also made efforts to meet with concerned environmentalists and marine mammalogists and incorporate their concerns into the project, Rogers said. A watchdog group of marine biologists not affiliated with the ATOC project has been developed to oversee the work of the Marine Mammal Research Program. The scientists in the group were selected by the National Marine Fisheries Service, a branch of the National Oceanographic and Atmospheric Association that enforces the Marine Mammal Protection Act of 1972 and must approve of the project.

Scripps expects to have the experiment



Scripps Institution of Oceanography

Sound of the sea. A network of underwater speakers will allow scientists to measure the ocean's temperature.

approved by the end of January 1995. If the program is approved, Scripps would immediately begin installing the speakers, and transmissions could begin that spring, Rogers said.

A Move for the Better

A change in where they live may change the outcome of a second pregnancy for women whose first child was born with a birth defect, according to a recent study published in the July 7 *New England Journal of Medicine*.

The odds of having a second child with a birth defect are small to begin with—about 2.2% in the Norwegian sample. However, the study, conducted by epidemiologists Rolv Terje and Rolv Skjaerven in Norway and Allen Wilcox at the NIEHS, revealed that among women who had given birth to one baby with a defect, those who continued to live in the same town had almost 12 times the risk of giving birth to a second baby with the same defect. However, if these women moved to a new town, the risk dropped to five times the normal risk. The study also showed a slightly increased risk of delivering a second child with a different defect from the first for women who remained in the same town.

The study examined birth records of first and second infants born to almost 400,000 women in Norway between 1967 and 1989. Twenty-three categories of isolated defects and a category of multiple defects including, for example, cleft lip and palate, limb defects, genital defects, anencephaly, respiratory system defects, and central nervous system defects were studied. One surprising finding of the study is that moving to a new town correlated with a decreased risk of birth defects more than the second child being fathered by a different man. With a different father the risk of defects in the second child fell to 7.3.

The authors say the study does not cast light on any causes for decreased risk, but when you move, said Wilcox, "you've changed some things: where you work, the house you live in. . . ." Wilcox said that the study is more promising for guiding future research rather than for suggesting preventive measures. The researchers concluded that there is strong indirect evidence that environmental factors contribute to the familial risk of birth defects and that "important environmental teratogens have yet to be discovered."

A Gray Area of Environmental Justice

The issue of environmental justice is hardly black and white, especially in the realm

Risk of similar and dissimilar birth defects in second infants of mothers with an affected first infant

Defect in first infant	No. at risk	Second infant					
		Similar defect			Dissimilar defect		
		Observed	Expected	Relative risk	Observed	Expected	Relative risk
Clubfoot	2784	100	14.7	7.3	59	42.0	1.4
Genital defect	1447	25	5.1	4.9	35	24.2	1.5
Limb defect	957	25	2.2	11.3	41	17.1	2.4
Cardiac defect	567	6	1.0	6.0	11	10.5	1.1
Total cleft lip	436	18	0.6	31.4	10	8.2	1.2
Isolated cleft palate	144	3	0.1	44.5	2	2.9	0.7
All combined	9192	201	26.4	7.6	249	164.6	1.5

Effect of a change in municipality or partner on the risk of a birth defect in the second infant similar to the defect in the first infant

Partner	Municipality	Similar birth defect in second infant					
		Mothers with affected first infants		Mothers with normal first infants		Relative Risk	
		Cases	Total	Cases	Total		
Same	Same	115	4200	454	192,990	11.6	
Same	Different	41	2332	310	89,588	5.1	
Different	Same	16	985	99	44,196	7.3	
Different	Different	10	749	78	28,861	4.9	

Source: Lie et al., *New England Journal of Medicine* (vol. 331, p. 3).

of research. Several studies surfaced in the late 1970s and 1980s providing evidence that polluting and waste facilities are more likely to be located in low-income and minority neighborhoods. This information has prompted widespread political action, but the methodologies used in these studies are now being challenged.

President Clinton issued an executive order on environmental justice, and Congress is also focusing on this issue, debating several bills that would guarantee environmental equity. But some researchers are questioning whether such political attention to the issue is warranted. Two recent studies cast doubt on the empirical evidence supporting the arguments of environmental justice advocates.

One of the studies, conducted at the Center for the Study of American Business at Washington University, examined environmental justice policy. "Our study is an overview of the issue from a policy perspective," said Christopher Boerner, who worked with Thomas Lambert on the study. Their findings indicate that further research should be conducted on the issue.

Boerner and Lambert, research interns at the center, analyzed the studies that provide evidence of environmental racism and detected several flaws in the research. These included inadequacies in how minority communities were defined and in population densities. The researchers said that defining minority communities as areas where the percentage of nonwhite residents exceeds the percentage of minorities in the entire population means that a

community could be considered minority even if the majority of its residents are white. They also pointed out that most of the studies are based on ZIP-code data, which are not necessarily accurate when examined on a smaller geographic unit.

Boerner and Lambert also argued that environmental justice studies imply rather than state actual risks posed by polluting and waste facilities since there is a lack of significant scientific data linking negative health effects with proximity to polluting and waste facilities. And finally, the study says that the research on environmental justice fails to establish that discriminatory siting and permitting practices caused current environmental inequities. The studies identify current economic and race characteristics of communities located around industrial and waste facilities, but they do not consider community conditions when the facilities were sited.

Boerner and Lambert's research supports one of their major concerns in regard to environmental justice: that policymakers may be acting too quickly on a subject that needs further research and evaluation.

Boerner and Lambert also examined alternative ways of approaching environmental justice as an issue, as opposed to current suggested solutions. Most of these current remedies include legislation that would prohibit or discourage construction of polluting and waste facilities in certain low-income and minority neighborhoods. Boerner and Lambert recommended that policymakers explore remedies such as compensation approaches, in which those